Section of Dermatology

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DISCUSSION ON PREVENTION AND TREATMENT OF PARASITIC DISEASES

Some Recent Work on the Louse

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It would be true to say that in any sort of applied biology one is always interested in the question of numbers of animals, that is to say, in populations. An agricultural entomologist does not want to know that a certain locust lives in a certain country; the question is a numerical one: are there enough locusts to eat the crops? Similarly the medical officer of health wants to know what part of his population is lousy, whether one race, sex, or age is affected more than another, or whether the incidence is higher at one season than at another.

When transmission of disease is involved, this matter of populations is extremely important, because one does not get transmission of disease by biting insects if they are scarce. Take, for example, the disappearance of typhus. No one can pretend that the louse has disappeared from this country, but typhus has. Up to 1880 the deaths from typhus for England and Wales were round about 1,000 a year. By 1890 they had fallen to about 100. After 1910 they were never above 10 in the year, and the last typhus death was in 1918. A number of causes may explain this decrease, including better personal hygiene and a reduction in the numbers of lice, but not by any means their disappearance. The same kind of result has been observed in other places. If one has to deal with an epidemic of louse-carried disease one can bring it to an end by achieving a partial control of the insect.

Six or eight years ago in the London School of Hygiene and Tropical Medicine we began to study populations of lice. We knew that if hair were dissolved in alkaline solutions of sodium sulphide one could recover the cuticles of the lice. We applied that simple technique on a large scale to samples of hair received from a number of places in Africa and Asia. The kind of thing we wanted was unselected samples of the local population; the best material that we could get was from the people admitted to certain jails. The first fifty people admitted each month had their entire scalp shaved and the whole of the hair was sent to us in an envelope with a brief statement as to age, sex, &c. We boiled the hair down with sulphide and took out the infesting lice, if any were present. We have done that with more than 3,000 complete crops of hair, of which 800 or 900 proved to be infested with the head louse. One must admit that our sample comes only from the population admitted to jail, and it is not possible to get a fair sample of the whole population of a country. Nevertheless, if we have the jail figures for a couple of years one can at least say whether there is a seasonal difference in the distribution of head lice, whether members of one racial or religious group are more or less infested than members of another, whether young jailbirds are more infested than old ones, and so on.

What we discovered is that the most important factor influencing the distribution of head lice among people is the weight of the individual's crop of hair. We have shown
with hair from six or seven different places that there is a strong positive correlation between weight of hair and frequency of infestation. The people with heavier crops tend to be more often infected and also that these factors influence, amongst other things, the speed with which the disease spreads. The importance of this is that it is possible to determine the relative importance of different factors by which the disease is spread. The correlation is highly significant and the results are consistent with the hypothesis that the disease is spread through the hair of infected individuals.

Most of the factors that we have looked into, such as sex, religion, and occupation, seem to be of secondary importance, though at first sight they may appear to have some influence. The correlation among people in jail, for example, is so high that one can hardly have any doubt about the situation. In the last war nearly everybody in the front line was infected. A battalion was taken over, rested, cleaned, and sent back. Within two or three days of their return the situation was the same as before, and within a few more days the infection spread as fast as it had ever been. What seemed to be needed was something, applicable to head or garments, which would kill the lice and remain active for a considerable period. The most promising thing so far available was worked out by two entomologists, Dr. McLeod and Dr. Crawford, who started a louse clinic in East London. The agent applied is a finely-ground powder and a few grains of this powder have been placed on the material, called A.L.3. If some of this powder is put on the garment and rubbed in it takes an extraordinary amount of shaking to get it out. If one wears a garment so treated not only will the lice die on it, but it will remain lice-free for about a week; that break of a week might be of great importance if we had to treat people in the shelters. The introduction in the continuity might prevent the house community from increasing and getting out of hand.

We in the London School of Hygiene and Tropical Medicine started out on a different line, searching for a liquid insecticide, a small quantity of which could be put inside garments. An effective material has been found (again we do not wish to publish the formula): a small dose of this material applied to a shirt renders it lice-proof for about a month.

Dr. A. M. H. Gray: The two groups of animal parasites which concern us most as dermatologists are pediculi and scabies. Problems connected with both of these groups constantly confront us in times of peace, but in war-time they may assume serious proportions and become a menace to the health both of those serving in the armed forces and of the civil population. In this war not only is the civil population faced with death and injury from military weapons, but also with the risk of those diseases which were specially prevalent in the last war, and from these pediculosis corporis is the most formidable, not in the main because of the skin conditions it produces but because it may transmit typhus, relapsing fever, and trench fever.

Infestation by head and public lice raises no new problems to-day. I propose therefore to compare the conditions under which infestation by the body lice and by scabies occur.

In peace-time pediculosis corporis is almost entirely found in the very lowest stratum of society, among the beastly troops and the occupants of common lodging-houses. In the last war, under conditions of trench warfare, it became rife in the Army. It was, however, only when men were in the line for prolonged periods that infestation was at its worst; in rest periods the condition improved, and in the end of the war, when men were in comfortable quarters, the trouble disappeared with remarkable rapidity. During the war it was there any appreciable increase in pediculosis in this country, though men were constantly returning on leave.

Two conditions are necessary for lice infestation: (1) contact with persons or articles already infested; and (2) conditions favourable for breeding on the skin. Wherever there are in all strata of society congregated together, such as in the trenches or in air-raid shelters, it is possible that one or more persons may be infested and if conditions for breeding are favourable, the infestation may not be long in spreading. The body louse is a fairly long-lived creature, it can survive for several weeks in clothing, blankets, etc., and will hatch out when temperature conditions are favourable. Once infestation begins in favourable surroundings it tends to spread by contagion or by contact. It is clear, however, that in a large gathering of the last war that conditions favourable for breeding are of far greater importance than chance infestation, otherwise pediculosis would not have died out with the rapidity with which it did at the end of the war and there would have been a great increase among the population at home during the war.

The two factors which favour breeding of lice are: (1) the continuous wearing of clothing for days on end, and (2) the fact that the lice are kept at a constant temperature and are able to wash the clothes at frequent intervals, so that any stray lice or nits may be killed or removed mechanically. It would therefore appear that if persons liable to infestation were to change their clothes once a day and spend their nights in shelters, they would be able to change their clothes at night and have their underclothing regularly washed, the chance of the lice obtaining a
foothold would be small, and that instruction of the public on these facts is most likely to avoid what might become a serious danger to the health of the community.

It is satisfactory to note that, though we have had four months of shelter life, no great increase in pediculosism has been reported, which suggests that the public are keeping up a high standard of cleanliness without any special advice on the matter, though this scarcely absolves the authorities from their responsibilities of making known the facts.

It is, of course, equally important to remove sources of infestation by the compulsory cleansing of persons known to be infested and by the cleaning of shelters and bunks.

It is better and easier for people to change and wash their clothes than to apply to them substances which will kill lice, and if, as I suggest, such simple sanitary measures are capable of preventing lice infestation then use of anti-louse agents should not be required for persons using shelters. The position is entirely different in the case of troops who are compelled for military reasons to wear their clothes continuously for long periods. Here anti-louse agents should be of the greatest value and we all appreciate the valuable work Professor Buxton has done and is doing in this connexion. When I wrote this I had not available to me the full particulars of the extremely interesting method of applying anti-louse remedies which Professor Buxton has just given. I see no reason why these remedies should not be used, provided the ordinary sanitary measures which I have suggested are also carried out.

I now turn to the question of scabies. This disease, although it causes a great deal of skin sepsis, with consequent loss of working time, fortunately does not give rise to serious general disease as does the louse. There is no doubt that it increased enormously during the last war, not only among the troops but also among the civil population. The cases treated in the Cleansing Stations of the L.C.C. during the last war illustrate this: 1914, 589; 1915, 1,059; 1916, 3,213; 1917, 6,940; 1918, 9,624; 1919, 8,371.

MacCormac states that in 1915 it was noticed that many men in drafts arriving in France were affected with scabies and my own observations point to the fact that in the forward areas a great deal of scabies occurred in men returning from leave and in drafts, and that it was not spread extensively in the line. The most striking confirmation of this is shown during the early days of the Army of Occupation in Cologne, when the older troops were being replaced by battalions of young soldiers from England. During February and March 1919, the number of cases of scabies per month rose from about 250 to 900, at a time when pediculosism had practically disappeared.

I have naturally been interested to see how the incidence of scabies has varied since the last war. It is impossible to get figures for the whole population, but it seemed that if one took the figures of scabies as found in school inspections of children in the L.C.C. area it might give some clue to the incidence of the disease among the general population.

![Incidence of scabies. Figures from school inspections of children in the London County Council area, 1919-1938.](image-url)